

REMARKS

I. Formalities

Applicant thanks the Examiner for acknowledging the claim for priority under 35 U.S.C. § 119, and receipt of the certified copy of the priority document submitted on December 10, 2003.

Applicant thanks the Examiner for considering the references cited with the Information Disclosure Statement filed on May 10, 2004.

II. Status of the Application

By the present amendment, Applicant amends claims 4 and 15 for reasons of grammar and clarity and add claims 32-36 to more fully cover various implementations of the invention. The amendments to claims 4 and 15 are not made for patentability reasons and do not narrow the scope of the claims. Accordingly, this amendment does not foreclose application of reasonable equivalents.

Claims 1-36 are all the claims pending in the application, with claims 1, 23 and 29-31 being in independent form. Claims 1-7, 11-20 and 22-31 have been rejected.

The present amendment addresses each point of objection and rejection raised by the Examiner. Favorable reconsideration is respectfully requested.

III. Allowable Subject Matter

Applicant thanks the Examiner for indicating that claims 8-10 and 21 would be allowed if rewritten in independent form. However, Applicant respectfully requests that the Examiner hold

in abeyance such rewriting until the Examiner has had an opportunity to reconsider (and withdraw) the prior art rejection of the other claims.

IV. Specification Objections

The Examiner has objected to the Abstract for various informalities. The informalities noted by the Examiner have been corrected, as set forth above. Thus, Applicant respectfully requests that the Examiner withdraw this objection.

The Examiner has also objected to the specification for various informalities. The informalities noted by the Examiner have been corrected, as set forth above. Applicant notes that the correction of German Patent Application DE 101 29 929 (which was incorporated by reference) to German Patent Application DE 101-~~2909~~ 929 does not constitute the addition of new matter since German Patent Application DE 10109 929 was also incorporated by reference on page 14, paragraph 37 of the originally filed specification. Accordingly, Applicant respectfully requests that the Examiner withdraw this objection.

In addition, the Examiner has objected to the specification, alleging that the specification fails to provide proper antecedent basis for the claimed subject matter. Applicant has amended paragraph 18 of the present specification, as set forth above, to address the recitations of claims 4 and 6 that were noted by the Examiner. As such, Applicant respectfully requests that the Examiner withdraw this objection.

V. Drawings Objections

The Examiner has objected to the drawings, alleging that the drawings fail to comply with 37 C.F.R. § 1.84(p)(5) because they include the reference character “35”, which is not

mentioned in the specification. Applicant respectfully traverses this objection. The present specification discusses to the reference character “35” in numerous instances. For example, paragraph 34 explains that “[b]y contrast, the entry surface 35 located in the immediate vicinity of the pupil plane is uncoated. It is provided as the correction surface of the system.” Further, paragraph 35 explains that “the entry surface 35 of the lens 13 nearest to the pupil is curved spherically, but it can also be an aspherical surface which, in this case, is designated a design asphere, since the asphericity is provided within the context of the optical design in order to contribute to the correction of specific image errors of the system.”

Therefore, Applicant respectfully requests that the Examiner withdraw this objection.

VI. Claim Rejections under 35 U.S.C. §102

The Examiner has rejected claims 1-3, 5, 13-14, 16, 23-24, 29 and 31 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent Publication No. 2002/0159040 to Hamatani et al. (hereinafter “Hamatani”). Applicant respectfully traverses these rejections for *at least* the independent reasons stated below.

According to the MPEP, “a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” (MPEP § 2131). Applicant respectfully submits that claims 1-3, 5, 13-14, 16, 23-24, 29 and 31 positively recite limitations which are not disclosed (or suggested) by Hamatani.

A. Independent Claim 1

Claim 1 recites a combination including the feature of selecting at least one surface as a “correction surface.” The combination recited in claim 1 further includes the features of, after

selecting the “correction surface,” removing the at least one optical element provided with the “correction surface” from the imaging system, locally resolving processing of the at least one “correction surface,” in order to produce at least one of the calculated topography and refractive index distribution of the “correction surface,” and installing the optical element having the processed “correction surface” in the predefined position.

That is, claim 1 recites a specific combination of operations including selecting at least one surface as a “correction surface,” and each of the subsequent steps of “removing... the correction surface,” “locally resolving processing of the... correction surface,” and “installing the optical element having the processed correction surface” depend on this selection of a “correction surface.” In other words, claim 1 recites a method which involves first selecting at least one defined surface which is then used to correct the optical system.

Applicant submits that the grounds of rejection have failed to recognize that many of the individual recitations of claim 1 have a distinct interconnection based on the initial selection of at least one surface as a “correction surface.” Indeed, the grounds of rejection have arbitrarily cited entirely unrelated sections of the Hamatani reference, but have failed to address the specific interconnection of the combination of recitations in claim 1.

For instance, independent claim 1 recites a specific combination including (among other things):

...selecting at least one surface provided as a correction surface on at least one of the optical elements, the correction surface being selected such that the correction surface is arranged in the surface of the exit pupil or a

surface conjugate therewith belonging to the
imaging system...

The grounds of rejection allege that the disclosure provided in paragraph 0146, line 5 of Hamatani corresponds to “selecting at least one surface provided as a correction surface,” as recited in claim 1. Applicant respectfully disagrees with the grounds of rejection.

In contrast to the recitations of claim 1, paragraph 0146, line 5 of Hamatani merely teaches that lenses near the pupil plane, or in the image plane side, of the projection optical system PL, or an aberration-correcting plate (optical plate) for correcting the projection optical system PL in terms of aberration, may be constructed to be able to be driven. (Paragraph 0146). However, Hamatani provides no disclosure or suggestion whatsoever regarding the feature of selecting a “correction surface,” as recited in claim 1. Rather, Hamatani simply discloses that certain lenses may be constructed to be able to be driven. Hamatani fails to disclose or suggest that any of the lenses near the pupil plane, or in the image plane side, of the projection optical system PL or an aberration-correcting plate (optical plate), are selected as a “correction surface,” as recited in claim 1. Moreover, Hamatani fails to teach or suggest that a specific surface is selected as a “correction surface,” and that the “correction surface” is then removed, processed, and reinstalled, as recited in claim 1. Therefore, Applicant submits that claim 1 is not anticipated by Hamatani for *at least* these reasons.

The specific combination recited in independent claim 1 also includes:

...calculating at least one of a topography
and a refractive index distribution of the at
least one surface selected as the correction
surface belonging to the optical element, in
order to correct the wavefront error...

The grounds of rejection allege that the disclosure provided in paragraph 0339 of Hamatani corresponds to the above feature. Applicant respectfully disagrees with the grounds of rejection.

Paragraph 0339 does not relate in any way to calculating at least one of a topography and a refractive index distribution of the at least one surface selected as the correction surface belonging to the optical element, in order to correct the wavefront error, as recited in claim 1. Claim 1 recites a specific combination including the features of assembling the imaging system with the optical elements substantially arranged in predefined positions, selecting at least one surface provided as a correction surface on at least one of the optical elements, and then calculating at least one of a topography and a refractive index distribution of the at least one surface selected as the correction surface.

However, contrary to the “calculating” operation recited in claim 1, paragraph 0339 of Hamatani, which is included under the heading “Step 2,” relates to the measurement of surface shapes of lens devices of a projection optical system PL prior to assembling the projection optical system PL. (See paragraph 0339). Indeed, the subsequent step of assembling the projection optical system PL is discussed in paragraph 0341, under the heading “Step 3.” (Paragraph 0341, lines 1-6).

Thus, if anything, paragraph 0339 of Hamatani teaches measuring the surface shapes of lens devices of a projection optical system PL prior to assembling the projection optical system PL. As a result, Hamatani does not disclose, and cannot possibly suggest, a combination including the features of assembling the imaging system with the optical elements substantially

arranged in predefined positions, selecting at least one surface provided as a correction surface on at least one of the optical elements, and then calculating at least one of a topography and a refractive index distribution of the at least one surface selected as the correction surface, as recited in claim 1.

Furthermore, lines 14-16 in paragraph 0339 of Hamatani disclose only that the shapes of the lens devices are measured using a Fizeau-type interferometer. However, the portion of Hamatani relied upon by the grounds of rejection does not provide any disclosure or suggestion regarding any calculation of at least one of a topography and a refractive index distribution of the correction surface, in order to correct the wavefront error of an assembled optical system, as recited in claim 1.

The specific combination recited in independent claim 1 further includes:

...locally resolving processing of the at least one correction surface, in order to produce at least one of the calculated topography and refractive index distribution of the correction surface...

The grounds of rejection allege that the disclosure provided in paragraph 0368, line 3 and paragraph 0369, lines 4-6 of Hamatani correspond to the above feature. Applicant respectfully disagrees with the grounds of rejection.

In contrast to the specific combination recited in claim 1, paragraph 0368, line 3 of Hamatani merely discloses that, if the readjustment of the projection optical system PL described prior to paragraph 0368 does not yield a desirable performance, then some lenses need to be reprocessed or replaced. (Paragraph 0368, lines 1-3). And, paragraph 0369, lines 4-6 of

Hamatani discloses that optical devices of the projection optical system PL may be individually replaced or that lens barrels as units may be replaced. (Paragraph 0369, lines 1-4). Paragraph 0369 also discloses that, if necessary, in reprocessing the optical device, its surface may be processed so as to become non-spherical. (Paragraph 0369, lines 4-6).

That is, the portions of Hamatani cited by the grounds of rejection merely disclose that, in certain cases, lenses may be reprocessed or replaced, and that non-spherical surfaces may be obtained in reprocessing the optical device disclosed therein. However, Hamatani fails to provide any disclosure or suggestion whatsoever regarding selecting what kind of lenses or surfaces should be reprocessed or replaced, or reprocessed so as to become non-spherical.

Claim 1 recites a specific combination of operations including first selecting at least one surface provided as a correction surface on at least one of the optical elements. Further, claim 1 recites the feature of locally resolving processing of the selected correction surface.

In stark contrast to the requirements of claim 1, Hamatani fails to disclose or suggest that there is any particular surface that is first selected so as to be processed later. To the contrary, as disclosed in Hamatani, if reprocessing is going to occur, the particular optical device in the projection optical system PL that needs reprocessing must first be identified based on the result of the wavefront measurement. However, Hamatani provides no disclosure or suggestion whatsoever regarding such an identification process or what kind of surface will ultimately turn out to be the surface that should be reprocessed. Indeed, as disclosed in Hamatani, the surface that needs reprocessing may be positioned anywhere in the projection optical system PL and the measurement is used to identify the surface. In contrast, claim 1 recites a specific combination

which includes first selecting a correction surface on at least one of the optical elements, the correction surface being selected such that the correction surface is arranged in the surface of the exit pupil or a surface conjugate therewith, and then locally resolving processing of the selected correction surface.

In view of the above, Applicant respectfully submits that independent claim 1 is not anticipated by (i.e. is not readable on) the applied Hamatani reference for *at least* these independent reasons. Further, Applicant respectfully submits that the dependent claims 2-3, 5, 13-14, 16 are allowable *at least* by virtue of their dependency on claim 1. Thus, Applicant respectfully requests that the Examiner withdraw these rejections.

B. Independent Claim 23

Independent claim 23 recites a specific combination including (among other things):

...a correction surface being provided on at least one surface, arranged in the vicinity of the pupil surface, of an optical element that is close to the pupil...

In view of the similarity between these requirements and the requirements discussed above with respect to independent claim 1, Applicant respectfully submits that arguments analogous to the foregoing arguments as to the patentability of independent claim 1 demonstrate the patentability of claim 23. As such, it is respectfully submitted that claim 23 is patentably distinguishable over the cited Hamatani reference *at least* for reasons analogous to those presented above. Further, Applicant submits that the dependent claim 24 is allowable *at least* by virtue of its dependency on claim 23. Thus, the allowance of these claims is respectfully solicited of the Examiner.

C. Independent Claim 29

Independent claim 29 recites a specific combination including (among other things):

...selecting at least one surface provided as a correction surface on at least one of the optical elements, the correction surface being selected such that the correction surface is arranged in the surface of the exit pupil or a surface conjugate therewith belonging to the imaging system...

...calculating at least one of a topography and a refractive index distribution of at least one surface provided as the correction surface belonging to the optical element, in order to correct the wavefront error...

...locally resolving processing of the at least one correction surface, in order to produce at least one of the calculated topography and the refractive index distribution of the correction surface...

In view of the similarity between these requirements and the requirements discussed above with respect to independent claim 1, Applicant respectfully submits that arguments analogous to the foregoing arguments as to the patentability of independent claim 1 demonstrate the patentability of claim 29. As such, it is respectfully submitted that claim 29 is patentably distinguishable over the cited Hamatani reference *at least* for reasons analogous to those presented above. Thus, the allowance of this claim is respectfully solicited of the Examiner.

D. Independent Claim 31

Independent claim 31 recites a specific combination including (among other things):

...selecting at least one surface provided as a correction surface on at least one of the optical elements, the correction surface being selected such that the correction surface is arranged in the surface of the exit pupil or an surface conjugate therewith belonging to the imaging system...

...calculating at least one of a topography and a refractive index distribution of at least one surface provided as the correction surface belonging to the optical element, in order to correct the wavefront error...

...locally resolving processing of the at least one correction surface of the optical element held in the mount, in order to produce at least one of the calculated topography and refractive index distribution of the correction surface...

In view of the similarity between these requirements and the requirements discussed above with respect to independent claim 1, Applicant respectfully submits that arguments analogous to the foregoing arguments as to the patentability of independent claim 1 demonstrate the patentability of claim 31. As such, it is respectfully submitted that claim 31 is patentably distinguishable over the cited Hamatani reference *at least* for reasons analogous to those presented above. Thus, the allowance of this claim is respectfully solicited of the Examiner.

VII. Claim Rejections under 35 U.S.C. §103

A. Dependent Claims 4 and 6

The Examiner has rejected claim 4 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Hamatani. Applicant respectfully traverses these rejections for *at least* the reasons set forth below.

The dependent claims 4 and 6 incorporate all the novel and non-obvious recitations of their base claim 1. As already discussed above, Hamatani fails to disclose or suggest all the recitations of claim 1. Therefore, Applicant submits that the dependent claims 4 and 6 are patentable over the cited Hamatani reference *at least* by virtue of their dependency on claim 1. As such, Applicant respectfully requests that the Examiner withdraw these rejections.

B. Dependent Claim 7

The Examiner has rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Hamatani in view of U.S. Patent Publication No. 2005/0007603 to Arieli et al. (hereinafter "Arieli"). Applicant respectfully traverses this rejection for *at least* the reasons set forth below.

The dependent claim 7 incorporates all the novel and non-obvious recitations of its base claim 1. As already discussed above, Hamatani fails to disclose or suggest all the recitations of claim 1. Further, Arieli fails to remedy the deficient teachings of Hamatani. Consequently, Applicant submits that the dependent claim 7 is patentable over Hamatani, Arieli, and any combination thereof, *at least* by virtue of its dependency on claim 1. Hence, Applicant respectfully requests that the Examiner withdraw this rejection.

C. Dependent Claim 15

The Examiner has rejected claim 15 under 35 U.S.C. § 103(a) as being unpatentable over Hamatani in view of U.S. Patent No. 5,223,978 to Burkhart et al. (hereinafter “Burkhart”).

Applicant respectfully traverses this rejection for *at least* the reasons set forth below.

The dependent claim 15 incorporates all the novel and non-obvious recitations of its base claim 1. As already discussed above, Hamatani fails to disclose or suggest all the recitations of claim 1. Further, Burkhart fails to remedy the deficient teachings of Hamatani. Consequently, Applicant submits that the dependent claim 15 is patentable over Hamatani, Burkhart, and any combination thereof, *at least* by virtue of its dependency on claim 1. Hence, Applicant respectfully requests that the Examiner withdraw this rejection.

D. Dependent Claim 25

The Examiner has rejected claim 25 under 35 U.S.C. § 103(a) as being unpatentable over Hamatani in view of “Nanometer-Asphaeren” by C. Hoffman et al. (hereinafter “Hoffman”).

Applicant respectfully traverses this rejection for *at least* the reasons set forth below.

The dependent claim 25 incorporates all the novel and non-obvious recitations of its base claim 23. As already discussed above, Hamatani fails to disclose or suggest all the recitations of claim 23. Further, Hoffman fails to remedy the deficient teachings of Hamatani. Consequently, Applicant submits that the dependent claim 25 is patentable over Hamatani, Hoffman, and any combination thereof, *at least* by virtue of its dependency on claim 23. Hence, Applicant respectfully requests that the Examiner withdraw this rejection.

E. Dependent Claims 11-12, 17-20 and 26-27

The Examiner has rejected claims 11-12, 17-20 and 26-27 under 35 U.S.C. § 103(a) as being unpatentable over Hamatani in view of U.S. Patent Publication No. 2002/0159040 to Nagayama et al. (hereinafter “Nagayama”). Applicant respectfully traverses these rejections for *at least* the reasons set forth below.

The dependent claims 11-12, 17-20 and 26-27 incorporate all the novel and non-obvious recitations of their base claims 1 and 23, respectively. As already discussed above, Hamatani fails to disclose or suggest all the recitations of claim 1 and claim 23. Therefore, Applicant submits that the dependent claims 11-12, 17-20 and 26-27 are patentable over Hamatani, Nagayama, and any combination thereof, *at least* by virtue of their dependency on claims 1 and 23, respectively. As such, Applicant respectfully requests that the Examiner withdraw these rejections.

F. Dependent Claims 22 and 28

The Examiner has rejected claims 22 and 28 under 35 U.S.C. § 103(a) as being unpatentable over Hamatani in view of U.S. Patent Publication No. 2004/0013956 to Sogard et al. (hereinafter “Sogard”). Applicant respectfully traverses these rejections for *at least* the reasons set forth below.

The dependent claims 22 and 28 incorporate all the novel and non-obvious recitations of their base claims 1 and 23, respectively. As already discussed above, Hamatani fails to disclose or suggest all the recitations of claim 1 and claim 23. Therefore, Applicant submits that the dependent claims 22 and 28 are patentable over Hamatani, Sogard, and any combination thereof,

at least by virtue of their dependency on claims 1 and 23, respectively. As such, Applicant respectfully requests that the Examiner withdraw these rejections.

G. Independent Claim 30

The Examiner has rejected claim 30 under 35 U.S.C. § 103(a) as being unpatentable over Hamatani, in view of Nagayama, and further in view of Arieli. Applicant respectfully traverses these rejections for *at least* the reasons set forth below.

Independent claim 30 recites a specific combination including (among other things):

...selecting at least one surface provided as a correction surface on at least one of the optical elements, the correction surface being selected such that the correction surface is arranged in the surface of the exit pupil or a surface conjugate therewith belonging to the imaging system...

...calculating at least one of a topography and a refractive index distribution of at least one surface provided as the correction surface belonging to the optical element, in order to correct the wavefront error...

...locally resolving processing of the at least one correction surface, in order to produce at least one of the calculated topography and the refractive index distribution of the correction surface...

In view of the similarity between these requirements and the requirements discussed above with respect to independent claim 1, Applicant respectfully submits that arguments analogous to the foregoing arguments as to the patentability of independent claim 1 over Hamatani demonstrate the patentability of claim 30 over Hamatani. As such, it is respectfully

submitted that claim 30 is patentably distinguishable over the cited Hamatani reference *at least* for reasons analogous to those presented above. Moreover, neither Nagayama nor Arieli remedy the deficient teachings of Hamatani. Therefore, Applicant submits that claim 30 is patentable over Hamatani, Nagayama, Arieli, and any combination thereof, for *at least* these reasons. As a result, Applicant respectfully requests that the Examiner withdraw this rejection.

VIII. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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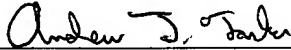
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